



## Composting Plan of Operation

### **Type of Facility and Handling**

Mt. Cuba Center is a botanical garden in Hockessin, Delaware. Our facility on Mt. Cuba Road currently accepts wood waste and yard waste from Mt. Cuba operations and processes them into mulch and compost. We started to accept leaves only from landscape contractors two years ago after our permit went through.

The mulch making processes begins with the stockpiling of wood waste, wood chips, and brush. Once a year these materials are ground up together by a contractor using a portable tub grinder. The tub grinder is initially fitted with a 4" or 6" screen to create a "single-ground" mulch. The Tub grinder screens are changed to a 3" and 4" screen and run through a second time making a double ground pile. This material is stockpiled into windrows no more than 15 ft. in height. The double-ground mulch is allowed to compost in place and turned if the temperature reaches 160° or when they need more air to keep them aerobic over the next 6-12 months. After 6 months we begin using the material as mulch on Mt. Cuba property. We incorporate leaves with a portion of the fresh material to create fine leaf/wood mulch.

Mt. Cuba currently stockpiles leaves from its own property in wooden bins over a concrete pad, where they are allowed to molder. We accept leaves from outside contractors as well to increase the supply of this material. In addition to being incorporated into the leaf/wood mulch, leaves are used directly as a mulch, and are also used to make compost.

Mt. Cuba uses an aerobic thermal composting process to process its organic yard waste and re-use it as compost or compost tea within our gardens. The organic waste is collected by staff and sorted and stored in appropriate labeled bins. Small diameter, straight branches are chipped using a Vermeer BC600XL chipper. The remaining woody waste is added to the stockpiles of material for Tub grinding. The materials are transported from the storage bins to the mixing area by a Ford F350XL Super Duty Dump Truck. Green waste is incorporated immediately into compost piles along with wood chips, leaves, and some shredded paper. These materials are mixed, equal part green materials and brown materials, by a Kubota L4630 Front End Loader with a 12 cu. ft. bucket or a 24 cu. ft. manure fork and watered to the proper moisture level. The material is then placed in a circular static pile or windrow then monitored for a rise in temperature. When the internal temperature of the pile reaches 155-160°F (as determined by compost thermometer) the pile is turned by the Kubota L4630 Front End Loader using the manure fork. The pile is turned several times until the pile temperature is close to air temperature. Once the compost is cooled the compost piles are arranged in 5 foot high windrows. Staff screen the finished compost using an EZ Screen 600 screener and stockpile the finished materials in bins before

use. The overs from screening are added to the next compost pile being made. The compost is then transported by the Ford F350XL Super Duty Dump Truck to various parts of the garden for use by staff. Staff spread the compost on garden beds using shovels and forks, use an Eco lawn 100 or a Millcreek 2100 top dresser to evenly distribute over turf areas, or add to a 60 gallon Dirt Simple compost brewer or a GEOTEA Compost Tea System to be used on turf or planted areas.

### **Schedule for operation**

The operation is open during our business hours 8:00 a.m.-4:30 p.m. Monday-Friday. Contractors drop off leaves during these times in the months of September, October, November, and December. The operation does not shut down unless snow or freezing makes the compost materials or area inaccessible. This facility will not be open to the general public. Some classes do visit the site.

Tub grinding takes place once a year, typically in November. Compost piles are created whenever there are sufficient feed stocks of green and brown organic waste. Each pile is turned until the process is complete.

### **Description of Solid Wastes**

Mt. Cuba's facility handles the following solid wastes:

- *Wood waste*: mainly logs from tree pruning and removal on the property, some damaged fence rails. The quantity of materials varies based on yearly operations.
- *Wood chips*: from tree contractors doing work on the property and from our own chipper.
- *Brush*:
- *Leaves*: from Mt. Cuba property and approved landscape vendors. Maximum of 700 cubic yards.
- *Green yard waste*: plant material residues resulting from regular care of our landscape, including small diameter pruning's, cut back herbaceous plant material, weeds, small quantities of grass clippings (grass clippings are left on lawns except in rare cases where they clump up excessively and have to be removed), and spent bulbs. Once we accumulate a few cubic yards of this material we make it into a compost pile.

Mt. Cuba's facility produces the following products

- Double-ground mulch: up to 600 cubic yards
- Leaf/wood mulch: up to 150 cubic yards
- Finished Compost: 150 cubic yards
- Active compost: 150 cubic yards

### **Monitoring methods**

The compost operator visits the site several times a week to check for any unauthorized wastes or pests. When active, compost piles are monitored once a week Monday through Friday for temperature and moisture. The temperature in the compost pile typically increases rapidly to 130 - 150°F within 24 to 72 hours of pile formation, which is maintained for several weeks. This is the active phase of composting. In this active phase, temperatures are high enough to kill pathogens and weed seeds and to break down toxic compounds. During this phase, oxygen must be replenished by turning the compost pile. During the turning of the compost pile, water is added as needed to maintain proper moisture levels.

We periodically review compost samples under a microscope to view the microorganisms present and adjust our practices accordingly. We also send out samples on occasion for standard compost analysis and biological analysis.

### **Ensure unauthorized wastes don't enter facility**

The feedstock storage areas along with the composting piles and finished product are located within fenced and gated areas. We close and lock the gates and only let staff or authorized contractors add organic materials. If unauthorized materials are found they will be removed and disposed of properly. If unauthorized materials are discovered in a load brought by an outside vendor they will receive a warning. If unauthorized materials are discovered in their materials a second time they will no longer be allowed to drop off materials at Mt. Cuba.

### **Personnel Training**

Peter Shotzberger Compost /Chemical Specialist

Is a Northeast Organic Farming Association (NOFA) accredited organic land care professional, has a Certificate of Technical Ability from the University of Maine Compost School and is a valued member of the grounds crew for 37 years. Peter (and a designated back-up grounds department staff person) are very well versed in all the operations of the equipment used in composting.

### **Pests & Risks**

Mt. Cuba is committed to not causing or allowing conditions that are harmful to the environment or public health, or create safety hazards, odors, noise or other public nuisances with its compost and mulch making facility. Since we process no food wastes there have been no problems with pests. Noise from the operation is limited and the facility is some distance from the closest neighboring property. By assembling compost piles regularly before large volumes of green waste accumulate and turning the piles frequently during their active period odors are minimal to non-existent. We keep the pile of ground mulch low (below 15 ft.), away from stockpiled wood waste and the adjacent woodland, and turn it to reduce the danger of fire.

### **Emergency**

If any Mt. Cuba staff detect smoke or a burnt smell in the compost facility they shall report it immediately to the Compost and Chemical Specialist, Grounds Manager, Director of Horticulture, and Safety Officer who shall investigate immediately. If these staff cannot be reached, call 911.